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Natural hazard management and sustainable development: a questionable link

The case of the area to the south of Grenoble

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EDITOR'S NOTE

Translation: Brian Keogh

- 1 Major hazards and sustainable development figure prominently today in both the language and fields of action of public policies. Identifying and managing risks¹, vulnerability levels, and associated economic stakes² on the one hand, and planning for the environmental, economic and social future of an area and its population on the other, appear to be two closely related concerns. It would thus seem appropriate to define and examine the possible link between major hazards and sustainable development.
- 2 There are at least three different aspects to this link: epistemological, technical and communicational. First, the epistemological content of the two terms is similar: in the demands of ecologists, the themes of risk and sustainability emerged simultaneously, foreshadowing their contemporary use. Next, recent regulations, such as planning measures, have tended to associate the two issues. Finally, both risk and sustainable development have become buzzwords, used by private and public actors alike but also by journalists, the general public and experts. The ways of justifying the link between the two terms may therefore vary considerably. In this respect it is interesting to observe the strategies of different actors, from decision-makers to technical specialists, as interests are reflected in language and viewpoints.
- 3 The Barnier Law, concerning the reinforcement of environmental protection, introduced the principle of precaution to France in 1995 and, for the very first time, explicitly brought together risk and sustainable development. Thus, we can examine the changes

brought about by this association: have we made the transition from the management of natural hazards to the sustainable management of an area subject to natural hazards?

- 4 The study of the area to the south of Grenoble, which is particularly at risk from the extensive landslide known as the "*Séchilienne Ruins*" (*Ruines de Séchilienne*) as well as from flooding (on the Romanche and Drac rivers), will provide us with insights into the relationship between risk and sustainable development and indicate how sustainability has gradually become part of natural hazard management. The significance of this area is twofold. First, the area to the south of Grenoble has had a special historical relationship with natural hazards³, which has contributed to a strong "risk culture". Second, the Barnier Law has been applied, for the first time, and in its entirety, to the landslide risk presented by the "Ruins". To examine public policy implemented in this field, we specifically concentrate on the positions taken by local actors. In addition to bibliographical research (gathering of scientific, technical, historical and legislative data), 15 semi-directive interviews were conducted between August and December 2006. The article is thus structured around three stages of analysis: the uncertain relationship between risk and sustainability (stage I), but a relationship that is nevertheless conceivable (stage II), and capable of causing indirect effects (stage III).

Figure 1. The Romanche valley and the "*Séchilienne Ruins*": in the foreground, the village of Séchilienne, the RN 91 road leading to Bourg d'Oisans, and the Romanche river.



Figure 2. Ile Falcon today: virtually all the buildings have been demolished – view from the top of Mont Sec.



Risk and sustainability: a questionable link

- 5 The existence of a relationship between risk and sustainability is not obvious. While opinion over the last ten years seems to have been in favour of an ideal and concrete association of these two issues in public action, this was not the case in the 1980s. At that time, apart from the fact that sustainable development had not yet been promoted as a reference for public policy, the identification and administrative management of natural risks were only in their infancy. Following a decree in 1955 – modified in 1961 and again in 1977 – establishing article R. 111-3 of the Code de l'Urbanisme (Urban planning code)⁴ (Besson, 2005: 432), the law of 1982, referred to as the "natural disaster indemnity" law⁵, laid the foundation for a natural hazard prevention policy, later to be completed by the 1985 Mountain law and the 1987 law on emergency services. The regulatory framework thus gradually became clearer in the 1980s and 1990s particularly with the development of innovative legislative tools.
- 6 This national context was explicitly reflected in the area to the south of Grenoble with the beginning of characterisation studies, around 1985, of the extensive landslide known as the "*Séchilienne Ruins*". The latter, located at Séchilienne and posing a direct threat to a hamlet in the neighbouring district of Saint Barthélémy de Séchilienne, has monopolised the attention of local actors and given rise to both anxiety and tensions among the populations concerned (Decrop, Dourlens, Vidal-Naquet, 1997; Decrop, 2004). Concerns have also been heightened by the fact that, for ten years, both experts and public authorities (particularly the State) debated the extent⁶ and timing of the event, without being able to reach agreement. Several hypotheses were put forward and it very quickly

became clear that “a major collapse of the mountain would create a dam on the Romanche, which would have every chance of breaking and thus releasing a devastating wave and causing a *catastrophe* (translation)” (P. Huet in Boisivon, 2007: 115), both upstream (where the local economy is based on the traffic in the valley) and downstream (where seven “high-risk” Seveso plants are located).

- 7 In this hazy context where uncertainty – understood as the possibility of a dangerous event occurring without its probability being known – dominates, taking this “*presumption of risk*” (Badré, Huet, 2006: 65) into account is expressed in the form of analyses, decisions and hesitant, even contradictory, actions that run counter to efficient and, possibly, sustainable planning. Unless there is certainty, it is difficult to plan for any overall future action. Moreover, the problem of the “Ruins” initially remained “compartmentalised” within the limits of the district of Saint Barthélemy, thus restricting the debate and the search for a solution to a “*sterile face-off between the State and the commune, which gets rid of the other local partners, both public and private* (translation)” (Servoin, 1997: 7), making any overall development action impossible.
- 8 As sociologist G. Decrop (1995: 29) has stressed, the case of the “Ruins” comes up against an uncertain economic situation in the short term, stemming from administrative and regulatory decisions, scientific uncertainty in the medium term (which persisted until 2000), and an insurmountable structural uncertainty (when and how will the mountain slide?). The mobilisation of public actors can thus be defined in terms of two types of action, one transversal, related to the implementation of technical solutions (modifying the layout of the RN 91 route, building a protective embankment, creating a diversion channel for the Romanche, etc.), the other, localised and focusing on the area of Ile Falcon, a hamlet in the district of Saint Barthélemy that would be directly affected should the mountain collapse. As early as 1987, all planning permits were suspended through application of the order R. 111-2, a common procedure at that time but unsuitable since it immobilised populations under threat (Decrop, Dourlens, Vidal-Naquet, 1997). The future of the hamlet only became clearer in 1995 with the promulgation of the Barnier law, which introduced measures to protect those populations threatened by certain major natural hazards⁷. By virtue of the inter-ministerial order of 31 May 1997, 115 hectares in Ile Falcon (representing 300 inhabitants, 94 houses and public facilities) were expropriated because of the risk of a major landslide, without any accompanying measures being introduced to assist the population or the community. This second series of preventive actions put the district in a situation of acute crisis, both economic and social. It lost a third of its population and fiscal resources and had to reconsider its development plans in the light of losing a hamlet. In 1998, it undertook steps to plan its future financial, demographic and social redevelopment through a “*redynamisation plan*”, aimed at “*turning a situation of potential natural catastrophe into a potential for development*”⁸. This political programme attempted to re-concile – albeit in a marginal way and at a micro-local level – risk and sustainability on the one hand, and the provision for a minimum of economic development for this threatened area on the other. For the moment, the social aspects of sustainability remain problematic, both financially and psychologically, given the unresolved situation regarding the six remaining families in Ile Falcon. The latter refuse to leave for different reasons (relating essentially to economic and identity concerns), a problem which highlights the underlying necessity for social sustainability (promoted by the Rio declaration of 1992), requiring the involvement of all the local actors in the decision-making process.

- 9 It is interesting to note that despite the scale of the potential consequences of such a risk, the problem of the "*Ruins*" remains localised at the micro scale since, for almost 20 years, the communes upstream and downstream of the site have not perceived the risk to be so serious. This reasoning at the scale of the location of the hazard and not at the scale of the area affected by the hazard (including both the area of the hazard and that of its consequences) is encouraged by the 1982 law which, with the formulation of Risk Exposure Plans, insists on the communal aspect. Until the Barnier Law and the introduction of the notion of a "*risk basin*" (Veyret in Boisivon, 2007: 117), the communes upstream and downstream of the "*Ruins*" thus had no reason to get involved. This legal blockage runs counter to a more global strategy at the scale of this area to the south of Grenoble, and thus long-term and potentially sustainable planning. The situation is further complicated by the difficult structural links between the various reference systems for public action that are mobilised in different ways depending on the level of decision concerned. By way of example, in the case of the "*Ruins*", the economic references may be expressed in terms of different issues oscillating between those of the future of a commune, good road service by the RN 91, or access to ski resorts. Thus, by using the notion of a risk basin, the spatial coordinates of the field of risk are enlarged, enabling a more efficient integration of the many actors involved. This contributes, at least hypothetically, toward a more direct link, even if gradual, between natural risk and sustainable development.

...but a link that is conceivable although delicate in practice

- 10 The second half of the 1990s was marked by the strengthening and further development of tools and regulations concerning natural hazards, giving them greater visibility. Laws (namely those of Barnier in 1995, Bachelot in 2003 and the modernisation of emergency services in 2004), decrees and orders helped define the current administrative framework for the management of major risks. At the same time, sustainable development became a major orientation of public action in France, directly associated with spatial planning measures in the Chevènement Law (1999) and Voynet Law (2000)⁹. Thus, from 1995, increased interaction between natural risk and sustainable development seemed to suggest a more efficient linking of these issues in the planning process. However, this interaction proved to be extremely delicate, tending to reinforce a communicational and institutional link rather than a practical link.
- 11 In the area to the south of Grenoble, the link between natural risk and sustainable development, up until 2000, was expressed locally through the question of the "*Ruins*" which tended to conceal other major risks despite the fact that these had been identified. Since that time, however, the risk of flooding has once again found its place in the field of prevention and action of the public actors involved. There are two reasons for this.
- 12 First, there is less scientific uncertainty regarding the "*Ruins*" following the publication of three major reports. The first two reports, known as "*Panet I*" (2000) and "*Panet II*" (2003), based on the work of a committee of international experts¹⁰ under the aegis of Professor Marc Panet, made it possible to determine with greater precision the nature of the risk associated with a collapse of the "*Séchilienne Ruins*", particularly the short-term risk that could materialise through a landslide in several phases of about 3 million m³ each. Based

on the results presented in these reports, an action plan comprising ten measures was launched by the Prefect of the Isère department in 2004, involving the setting up of a permanent committee of experts and the study of different technical solutions to deal with this risk¹¹. In 2005, a mission undertaken by engineers from the Highways Department (Ponts et Chaussées), agricultural engineers and forestry experts under the direction of Philippe Huet, chief engineer, also produced a report (the "Huet" report). This identified the economic consequences of a landslide and proposed studying solutions for medium- and longterm scenarios. Three types of action were recommended: highway solutions, hydraulic solutions, and crisis and land use management.

- 13 Second, regulations evolved in a transversal manner and with an eye on the future: the prevention of natural hazards of every type (avalanches, floods, earthquakes, landslides, etc.) led to a systematic increase in the awareness of risks, with an approach based on risk basins.
- 14 With regard to the flooding risk, studies of the Drac and Romanche rivers¹² were conducted in 1999¹³, and a flood risk prevention plan (PPRI)¹⁴ was recommended at the scale of the lower Romanche valley. All these studies reflect a major change that has occurred in recent years, this being towards dealing with risks at a more realistic spatial scale. This approach allows a more general vision of an area in terms of development, but comes into conflict with political and administrative divisions (communities of communes, associations, basins, etc.) giving rise to an increasingly complex system of actors involved. The fields of expertise as well as the differing interests and stakes of the actors involved are not necessarily compatible. This situation, which is a possible source of tension, does not lend itself to a smooth and harmonious development of the area. Indeed, it tends to make the link between risk and sustainable development relatively weak.
- 15 With the implementation of the flood risk prevention plans and the renewed emphasis on the risks of the hundred-year flood on the Romanche, the urban and economic development of the largest communes to the south of Grenoble, Vizille and Bourg d'Oisans, was seriously called into question. The direct consequences of this are important for their land-use planning and management. Urban development in Vizille has thus been blocked for more than four years. The majority of new urban development projects (business parks, housing construction, renovation, and reclassification of industrial wasteland) have now been shelved pending the next reports from the experts and the identification of solutions such as the consolidation of embankments. At the moment, the impact of this "nondevelopment" is not yet visible: the population increased by 1% per year from 1999 to 2004, while the increase observed in real estate values has mirrored that of Grenoble¹⁵. Nevertheless, it is certain that ultimately the impact of this constraint on urban development will be felt in the community's finances (reduction in local taxes). This suspension of urban development in Vizille also affects the economic development of the community of communes to the south of Grenoble, which was counting on the land resources of Vizille. Similarly, Bourg d'Oisans has seen its urban development halted in the entire flat area of the town. In both these cases, the situation is far from clear at the moment and local representatives are bitter: *"Between the 'Séchilienne Ruins' and the hundred-year flood on the Romanche, estimated at 1 000 m³/s. in Vizille, we are in the process of killing a valley... because when you block construction and economic development, you create a desert or an Indian reserve (translation)"*¹⁶. These situations of instability are counter to the development of any lasting vision for these areas and, in reality, even tend

to jeopardise any link between sustainable development and natural hazards. However, our analysis should not stop with these first observations in the field. The difficulty of linking these two issues lies in the very foundations of sustainable development and it proves to be that it is in terms of its indirect effects that risk management helps promote a sustainable area.

A more indirect link?

- 16 While the legislative framework of risk has become consolidated over the years, this is not at all the case for sustainable development. Even though numerous authors (Jollivet, 2001; Guermon, Mathieu, 2005) agree that sustainable development has now entered every field of action and public policy, it has become the subject of abusive generalisation, *"an idealistic political aim more than a rigorous and immediately operational reality"* (translation) (Mancebo, 2006: 20). This has resulted in certain professionals in the planning field avoiding use of the term: *"If we want to know what we are talking about, it is better to avoid it. Everyone interprets it in their own way, so that we think we understand each other and agree, but in reality we agree on nothing"* (translation)¹⁷. The concept is thus still perceived as hazy and vague, a bit like a *"suitcase in which everyone can put his or her own preoccupations and objectives"* (translation) (Ascher, 1998: 10). Associated with this semantic permissiveness is the other side of the coin in the form of its overuse in the media, which accentuates its loss of content in favour of its use in communications and as a tool to achieve a particular aim. In more concrete terms, this is reflected in a contradictory attitude among local actors: a hesitant positioning with regard to its definition¹⁸ and its use, but a use nevertheless that is almost imposed by an idealistic policy orientation. Thus, sustainable development is clearly subject not only to territorialisation, in the way its major world principles are implemented at the local level, but also to appropriation and differentiation by local actors according to different parameters: militant positioning, interpretations by different disciplines, the political culture of populations, or even political opportunism (Andres, Faraco, 2007).
- 17 In this way, the elected representatives of the area to the south of Grenoble are part of the current context where local planning tends to be associated with sustainability. Even so, while recognising the obvious link between protection against natural hazards and the sustainable development of the area concerned, the representatives interviewed have a number of reservations concerning the troubles encountered recently, namely in relation to building restrictions. In this regard, they mention the frequent divergence between regulations and directives, and the specific characteristics of local areas: difficulties of adaptation, limited transversal vision between different uncertainties, and the political, economic and social impacts at different scales. Thus for certain observers the challenge for public policy lies in better judgement of the acceptability of risk¹⁹ and a limitation of the abuses of its excessive division into sectors. *"Control nature at all costs? Yes, it can be done, but maybe we can build in a different way. If we channel the Romanche, we will increase its flow rate and increase risk"* (translation)²⁰. Beyond that, because of the weighty consequences of the principle of precaution, the economic aspects of development seem, for local public actors, largely incompatible: *"If we interpret risk in the Alps as the French State does, we do not have sustainability, because we are not economic. Risk and sustainability could be compatible but today they are not managed in this way"*²¹. The elected representatives of the area to the south of Grenoble thus provide a pragmatic and operational vision of

the link between risk and sustainability, a link varying in strength and with a marked local character. This interpretation is not necessarily found among the professionals in planning and risk management who formalise the link in a more technical and transversal way: *"The aim is to bring together the interests of sustainable development with those of taking risk into account. This must be done by considering all the economic, social and environmental dimensions"* (translation)²².

- 18 For all that, in communal and inter-communal town-planning practice it appears that an implicit link is beginning to emerge between preventive management of natural hazards and sustainable planning. In fact, the problems of unsuitability for building linked to the risk of the hundred-year flood have given rise to a reconsideration of the sustainable development of south Grenoble. The policies outlined in the Master Plan for the Grenoble region (2000) are being re-examined. In the Master Plan, Vizille was identified as an urban centre to be developed. However, with the restrictions on urban development, its role as a centre for the local area may, ultimately be called into question. How then can you get round this problem of an increasing number of zones that are unsuitable for building and manage risk while continuing to develop a community? Just as the town centre of Grenoble had to reconsider, at a very early stage, development on its existing built area, on account of the limited area of available building land (1 830 hectares), communes subject to risk, such as Vizille and Bourg d'Oisans, must today rethink their development and rebuild on the existing area. While limited land resources are the main reason behind the application of the principle of urban renewal in Grenoble, it is the taking into account of risk that seems today to favour this re-conquering of available and transformable land in the periurban communities south of Grenoble. This necessity is in line with the aims of sustainable development, acting as a protector of natural and agriculture areas. Indeed, as the Director of the SCOT in the Grenoble region has underlined, this action *"of economising on space"* aims at *"finding places for development and thereby enabling an offer of housing or sites for economic activities in built areas that are already occupied to varying degrees"*. This makes it possible to set up *"a process of more sustainable development"*²³, a process due in part to the existence of these major natural risks. In this way, the risks may be considered as an indirect incentive in other words as a "stimulating constraint" contributing to more sustainable land-use planning and management in the built and non built zones of tomorrow.

Conclusion

- 19 Analysis of natural hazard management, using first the case of the *"Séchilienne Ruins"* then that of the risk of flooding on the Romanche river, has demonstrated, at the scale of the local area to the south of Grenoble, the way in which natural risk and sustainable development can be linked together. This association does not at first sight appear obvious, namely because the range of legal tools makes it difficult to envisage risk as a factor to be taken into account in planning and development. Another reason is that the problem of risks is by its very nature characterised by a large element of uncertainty, the spatial expression of which remains compartmentalised within administrative boundaries. Sustainable development is thus merely a tool in communications and no more than marginal to policies. In addition, while risk and sustainability are explicitly linked from a legislative viewpoint, their operational association is seen to be more delicate. Despite a new approach based on a more realistic interpretation of the spatial

extent of risk and enhanced scientific knowledge, risk prevention may run counter to sustainable planning from an economic and social point of view. Interaction between these two issues in public policy is thus jeopardised by the diversity of the processes involved in the appropriation and territorialisation of sustainable development. Nevertheless, it is through the constraints associated with risk management that indirect effects are now appearing (better land management and promotion of urban renewal) and are working in favour of more sustainable areas.

- 20 Although the link between risk and sustainability seems evident, its relevance is found to be fragile in reality, particularly at the technical and communicational level. Finally, the envisaged changeover from natural hazard management to the sustainable management of areas subject to natural risks is not so obvious. It should not be seen as a linear process and must above all be thought through carefully in all its complexity, taking into account for example the diversity of tools, the systems of actors and the juxtaposition of spatial boundaries (areas of risk, political and administrative limits, etc.). The transposition of this analysis to other studies and particularly other types of risk (natural or technological) must now also be considered. Once again, the construction of the link between risk and sustainability will probably depend on the types of risk (breach in a dam, industrial risk, avalanche, earthquake, etc.), the areas concerned and the strategies of the actors involved.

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NOTES

1. Here, we consider the term risk to mean "the possibility (or not) of the occurrence of a natural phenomenon resulting from factors or processes which are in part beyond man's control (translation)" (Besson, 2005: 554).
2. The stakes correspond to persons and/or property likely to be affected by a natural phenomenon.
3. Landslides and flooding on the Romanche river were mentioned as early as the 17th century. (Cœur, 1995).
4. Art. R. 111-3 (abrogated): "Construction on land exposed to a natural hazard [...] may, if it is authorised, may be subject to special conditions. This land is delimited by order of the prefect [...]"
5. Law which created Risk Exposure Plans (Plans d'Exposition aux Risques) in the decrees specifying the manner of its enforcement.
6. The quantities involved in the risk of collapse have been successively estimated at: 2, then 5, 10, 50, and finally 100 million m³
7. Namely article 11 which states that: "when a foreseeable landslide risk [...] seriously threatens human life, the State may declare expropriation to be in the public interest [...] (translation)".
8. Comments obtained during an interview with an elected representative of the area to the south of Grenoble on August 23, 2006. Note that this position, attributing a positive value to catastrophe as a source of development, is found among different authors such as Stephenson (1991).

9. According to the Voynet Law, « the policy for sustainable planning and development enabled a balanced development of the entire national territory combining social progress, economic efficiency and environmental protection ».
 10. Committee appointed by the Minister of Ecology and Sustainable Development (Ecologie et du Développement Durable).
 11. Until then, studies had mainly concerned the risk itself and its evolution rather than solutions.
 12. Characterised by rapid flood flow.
 13. Study conducted by SOGREAH, hydraulic consultants, Grenoble.
 14. The Flood Risk Prevention Plan was recommended by order of the Prefect in August, 2005 (flooding of the Romanche and collapse of the « Séchilienne Ruins » are taken into account).
 15. Comments made during an interview with an elected representative of the area to the south of Grenoble, 29 September, 2006.
 16. Comments made during an interview with an elected representative of the area to the south of Grenoble, 14 September, 2006.
 17. Comments made during an interview with a technician of the Isère planning and development division (DDE), 18 September 2006.
 18. During our interviews, each representative explained his or her own personal definition of sustainable development.
 19. Comments made during an interview with a technician of the Isère planning and development division (DDE), 18 September 2006.
 20. Comments made during an interview with an elected representative of the area to the south of Grenoble, 23 August, 2006.
 21. Comments made during an interview with an elected representative of the area to the south of Grenoble, 14 September, 2006
 22. Comments made during an interview with a technician of the Isère planning and development division (DDE), 14 September 2006.
 23. Comments made during an interview with the Director of the Schéma de Cohérence Territoriale (SCOT) of the Grenoble region, September 1, 2006.
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ABSTRACTS

This article examines the nature of the possible link between natural hazards and sustainable development through a study of the area to the south of Grenoble in the French Alps, a zone subject to two major natural hazards: the extensive landslide known as the "Séchilienne Ruins" and flooding from the Romanche and Drac rivers. More specifically, the study analyzes the assumed transition from the management of natural hazards to the sustainable management of an area subject to natural hazards and is divided into three stages. Thus the link between natural hazards and sustainability is considered as: 1) an association that is entirely relative, 2) one that is logical but limited in the field, 3) one that is above all indirect. The interactions identified between risk and sustainability, in legislative as well as ideal and operational terms, are found to be complex and not necessarily explicit. They depend in particular on the juxtaposition of multiple territorial scales or spatial boundaries (national to local) that bring into conflict the different strategies of the actors involved – from decision-makers to technical specialists.

Cet article questionne la nature du lien envisageable entre risque naturel et développement durable à travers l'étude du territoire du sud grenoblois, soumis notamment à deux aléas naturels majeurs : le mouvement de terrain de grande ampleur dit des « Ruines de Séchilienne » et les probables crues de la Romanche et du Drac. Trois étapes structurent cette réflexion questionnant la transition supposée entre une gestion des risques naturels et une gestion durable des territoires soumis aux risques naturels : une association toute relative, un lien logique mais limité sur le terrain, une relation surtout indirecte. Les interactions identifiées, en termes législatifs mais aussi idéels et opérationnels, entre risque et durabilité se révèlent ainsi complexes et ne sont pas forcément explicites ; elles dépendent en particulier de multiples échelles territoriales (nationales à locales), confrontant alors pour l'essentiel des stratégies d'acteurs – porteurs des décisions ou du savoir technique – distinctes.

INDEX

Keywords: hazard management, natural hazards, regional planning, strategies, sustainable development

Geographical index: Drac, Romanche, Séchilienne

Mots-clés: aménagement du territoire, développement durable, gestion des risques, risque naturel, stratégies d'acteurs

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